FORM PTO-1390 (Modified) (REV 11-98) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: 66477-015-5

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR): 09/889171

INTERNATIONAL APPLICATION NO	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/SE00/00043	13 JANUARY 2000	15 JANUARY 1999

TITLE OF INVENTION

METHOD FOR A ROBOT

APPLICANT(S) FOR DO/EO/US

POTUCEK, Igor; ELLQVIST, Staffan

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3 28 and 3 31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ Certificate of Mailing by Express Mail
20. ☒ Other items or information:

WO 00/41852

English Translation of the Reply to Written Opinion

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/889171	PCT/SE00/00043	66477-015-5

21. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

		CALCULATIONS PTO USE ONLY
☒	Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO and International Search Report not prepared by the EPO or JPO	$1,000.00
☐	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO	$860.00
☐	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO	$710.00
☐	International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4)	$690.00
☐	International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4)	$100.00
	ENTER APPROPRIATE BASIC FEE AMOUNT =	$1,000.00
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☒ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).		$130.00

CLAIMS	NUMBER FILED		NUMBER EXTRA		RATE	
Total claims	10	- 20 =	0	x	$18.00	$0.00
Independent claims	1	- 3 =	0	x	$80.00	$0.00
Multiple Dependent Claims **(check if applicable).**				☐		$0.00
	TOTAL OF ABOVE CALCULATIONS				=	$1,130.00
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) **(check if applicable).**				☐		$0.00
	SUBTOTAL				=	$1,130.00
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).					+	$0.00
	TOTAL NATIONAL FEE				=	$1,130.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).**				☐		$0.00
	TOTAL FEES ENCLOSED				=	$1,130.00
						Amount to be: refunded $
						charged $

☐ A check in the amount of to cover the above fees is enclosed.

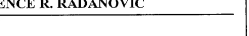
☒ Please charge my Deposit Account No. **04-2223** in the amount of **$1,130.00** to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **04-2223** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

LAWRENCE R. RADANOVIC, REG. NO. 23,077
CUSTOMER NO. 25269


SIGNATURE

LAWRENCE R. RADANOVIC
NAME

23,077
REGISTRATION NUMBER

11 JULY 2001
DATE

66477-015-5

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	PATENT
	)	
POTUCEK, Igor et al.	)	Group:
	)	
Serial No.: based on PCT/SE00/00043	)	Examiner:
	)	
Filed: July 11, 2001	)	ATTN: PCT

Method for A Robot

PRELIMINARY AMENDMENT

July 11, 2001

Box PCT
Assistant Director for Patents
Washington, D.C. 20231

Sirs:

Before examination, please amend the above-identified application as follows:

IN THE CLAIMS:

Please amend claims 1 to 9 as follows:

1. (Amended) Method for synchronizing a robot that includes a control system, a first robot part and a second robot part movably attached to the first robot part, whereby the position of a target arranged on the first robot part is determined by the passage of a sensor arranged on the second robot part, comprising the steps of causing the target to include several distinct detectable changes comprising step-like structural changes, sensing at least two of said distinct detectable changes by the sensor, calculating the position of the target, and introducing the calculated target position into the control system and comparing the target position with a calibration position for the target in the control system.

2. (Amended) Method according to claim 1, wherein calculating the position of the target is effected by reading with the sensor which comprises a non-contact sensor.

3. (Amended) Method according to claim 1, wherein calculating the position of the target is effected by reading with the sensor which comprises a contact sensor.

4. (Amended) Method according to claim 1, wherein the target comprises a groove with substantially vertical walls.

5. (Amended) Method according to claim 1, wherein the target comprises an elevation with substantially vertical sides.

6. (Amended) Device for synchronizing a robot that includes a control system, a first robot part and a second robot part movably attached to the first robot part, the device comprising a target arranged on the first robot part and a sensor arranged on the second robot part, wherein the target includes several distinct detectable changes comprising step-like structural changes.

7. (Amended) Device according to claim 6, wherein the step-like structural changes comprise instantaneous level differences in the form of shoulder parts.

8. (Amended) Device according to claim 6, wherein the target comprises a groove with substantially vertical walls.

9. (Amended) Device according to claim 6, wherein the target comprises an elevation with substantially vertical sides.

Cancel claim 10.

REMARKS

Claims 1 to 9 have been amended to more closely conform the application to U.S. standards. Claim 10 has been cancelled. No new matter has been introduced, and all multiple dependent claims have been cancelled.

Attached is a marked-up version of the changes made to the claims by the current Preliminary Amendment.

Entry is believed in order.

Respectfully submitted,

Lawrence R. Radanovic, Reg. No. 23,077

Attorney for Applicants

ID39845

"25269"
"Patent, Trademark Office"

Versions with Markings to Claims to Show Changes

1. (Amended) Method for synchronizing a robot [(1)] that includes a control system [(2)], a first robot part [(3)] and a second robot part [(5)] movably attached to the first robot part [(3)], whereby the position of a target [(4)] arranged on the first robot part [(3)] is determined by the passage of a sensor [(6)] arranged on the second robot [(5)], comprising the steps of causing [characterized in that] the target [(4) is caused] to include several distinct detectable changes [(4a, 4b)] comprising step-like structural changes, sensing [that] at least two of said [these] distinct detectable changes [(4a, 4b) are sensed] by the sensor [(6)], calculating [that] the position [(4c)] of the target [(4) is calculated] and introducing [that] the calculated target position [is introduced] into the control system and comparing the target position [compared] with a calibration position for the target [(4)] in the control system.

2. (Amended) Method according to claim 1, wherein calculating [characterized in that] the position of the target is effected by reading with the [(4) is read with a] sensor [(6) in the form of] which comprises a non-contact sensor.

3. (Amended) Method according to claim 1, wherein calculating [characterized in that] the position of the target is effected by reading with the [(4) is read with a] sensor [in the form of] which comprises a contact sensor.

4. (Amended) Method according to claim 1, wherein [any of the previous claims characterized in that] the target [(4) is designed as] comprises a groove with [essentially] substantially vertical walls [(4a) and (4b)].

5. (Amended) Method according to claim 1, wherein [characterized in that] the target comprises [(4) is designed as] an elevation with [essentially] substantially vertical sides [(4a') and (4b')].

6. (Amended) Device for synchronizing a robot [(1)] that includes a control system [(2)], a first robot part [(3)] and a second robot part [(5)] movably attached to the first robot part [(3) where], the device [includes] comprising a target [(4)] arranged on the first robot part [(3)] and a sensor [(6)] arranged on the second robot part, wherein [(5) characterized in that] the target [(4)] includes several distinct [by the sensor (6)] detectable changes [(4a, 4b)] comprising step-like structural changes.

7. (Amended) Device according to claim 6, wherein [characterized in that] the step-like structural changes comprise instantaneous level differences in the form of shoulder parts [(7)].

8. (Amended) Device according to claim 6, wherein [characterized in that] the target comprises [(4) is designed as] a groove with [essentially] substantially vertical walls [(4a) and (4b)].

9. (Amended) Device according to claim 6, wherein [characterized in that] the target comprises [(4) is designed as] an elevation with [essentially] substantially vertical sides [(4a) and (4b)].

Cancel claim 10.

4/PRTS

Method for a robot

TECHNICAL FIELD

The present invention relates to method for, a device for, and the use of positional measurement during the synchronising of a robot.

BACKGROUND

During operation, an industrial robot has to meet high requirements regarding precision and accuracy. The industrial robot carries out defined reproducible movements over a program-controlled linkage system driven by means of electric motors. The dimensions of the movement of the individual driving groups is controlled and supervised by an electronic path-measurement system. The zero positions of the driving system and the path-measurement system must correspond and be set to correspond again should deviations occur. An industrial robot thus has a need for a device for the exact and reproducible setting of the motor-driven linkage system of the robot. It is necessary to calibrate a robot to fulfil the demands for precision and accuracy named above and, following periods of stoppage of production and after service, it is necessary to synchronise the robot in order to meet the demands named above.

Here, calibration refers to initiating a configuration of a robot at start-up. The aim is to find the exact configuration (zero-position / calibration position) of the robot at the time when turning on the power and initiate the verifying part of the control system accordingly.

Here, synchronisation refers to checking or setting the robot to the zero-position / calibration position following service stops (e.g. replacing a motor), stoppages of production, collision and the like.

Industrial robots working with high accuracy are equipped with servo-controlled motors. To check a motor, a sensor has to measure the exact position of the angle of the motor

axle in real time. In servo motors, positional information together with angular speed is used in a feedback system to clear differences between predetermined and actual positions. Positional information cannot be used to check the robot if the measurements do not reflect the actual position of the robot. The goal of calibration is thus to initiate measurements of its "true/real" values.

When working with industrial robots, the need thus arises for a method for positional measuring to be used when calibrating and synchronising a robot.

The American document US,A 4 419 831 specifies a device that allows calibration of a linkage system that can be brought to correspond accurately with the calibration of an electronic path-measuring system even after replacement of parts of the drive or path-measuring system respectively. In a moveable part of two associated linkage parts, a recess or an elevation is arranged, and in an associated second linkage part, a guide for a measuring sensor instrument is adjustably and fixably arranged, where the sensing element of the instrument indicates the calibration position / zero-position during relative movement of both the linkage parts by determining the minimum respectively maximum of the recess or elevation. The object of the measurement method is to get the possibility to use the same program following replacement of measuring system or manipulator.

Service stops and other shut-downs mean disturbance of production lines and non-production, which leads to large and unwanted costs. It is thus of greatest importance that the time for shut-downs is minimised. Since the robot must be calibrated / synchronised after every stoppage, it is important that this is carried out quickly. At the same time, it is of greatest importance that the method is simple, accurate and has good reproducibility. Thus, the need arises for an accurate, simple and quick method for positional measuring.

This need cannot be met by the method in the American patent.

SUMMARY OF THE INVENTION

A robot system includes several partial systems, among others manipulator and control system. The manipulator is defined as the linkage arms, joints, transmissions and driving means that are included in the mechanical arm. The control system generates movements of the manipulator by servo-steering of the individual driving means as well as defined movements through a control and interpolation model of the physical construction of the manipulator. In the following, the term ''robot'' relates to a robot system including, among other things, manipulator and control system as defined above.

During manufacture, the robot is provided with a computer program that includes stored co-ordinates that correspond to pre-programmed points in the surrounding space. The robot is designed so that an operator can press a key on a keyboard whereby signals go to the different parts of the robot and direct them to take up the pre-determined positions and adjust themselves accordingly. This can be described as the robot being configured to its zero position / calibration position.

The robot is configured to the calibration position as above. Then the robot is calibrated with, for example, an external method that gives calibration values for respective rotation axle, which comprise reference values that are fed into the control system and stored.

To fulfil the demands named above for an accurate position measuring of the robot, a first robot part is provided with a physical target. A second robot part movably attached at the first robot part includes a sensor. The movement between the robot parts is translational or rotational. The position of the target is detected with the help of the sensor, which gives the offset angle a.

An installed robot thus has a calibration value and an offset angle a stored for the respective axis of rotation. The robot can be started and driven until it for some reason is stopped / stops. When necessary actions have been taken and it is time to start the robot again, the synchronising position of the robot must be checked. This means that the calibration program is run, the robot adjusts itself to its zero position / calibration position and the position of the target is measured for the respective axis, an angle da is calculated and compared with the stored offset angle a.

The difference d between the angle da measured and the offset angle a is calculated and presented as the offset of TCP (Tool Centre Point). The calculated difference d is shown on the screen of a programming controller. The value of d is shown graphically on the screen and is compared with a pre-determined limit value. When the value of the difference lies under the limiting value, the robot is ready for operation. However, when the value of the difference exceeds the limit value, it means that the configuration of the robot no longer corresponds to the stored calibration values. In that situation, it is necessary to begin again by configuring and calibrating the robot with, for example, an external method to obtain new calibration values for the zero position. After that, one continues by measuring new offset angle a and so one according to that above.

The object of the present invention is thus to achieve a method with which one can quickly, simply and with great accuracy synchronise a robot.

The solution according to the invention is to arrange a physical target on the moveable part of the robot at the respective robot axles and during displacement of the moving part back and forth, read at least two by the movement separate and distinct positions of the target with a transmitter, calculate the centre position / mean value and introduce the value into the control system.

The term robot axle relates to the moving axles of the robot for one of the rotation or translation movements.

In the cited American document, the target is designed either as a V-shaped depression or elevation and the transmitter measures the equivalent minimum or maximum points. The designing of the target as a point involves certain disadvantages. A point is easy to damage. The contact transmitter and further handling of axles results in a certain wear of the point, which has a detrimental effect on the accuracy. In addition, the possibility for positionally measuring a target during translational movement is not stated.

Measuring the position of a point with a contact transmitter is difficult with regard to the techniques of measurement. A point has two flanks and with a contact transmitter, problems of sliding occur along one of the flanks irrespective of whether it is an elevation or a depression. A contact transmitter, which reads the position of the point of a pointed target as it passes the transmitter back and forth displays a value with built-in errors in measurement due to the difficulty partly in following the surface of the point and partly in deciding exactly where the point is located. A more blunted point reduces the problem of sliding but does not give such a clear point position to sense.

To measure the position of a point with a non-contact transmitter requires an expensive and complicated transmitter to achieve reliable measurement results. In addition, high demands on precision are made in the designing of the point, which leads to extra costs. Furthermore, the transmitter should have a comparatively larger field of reading to be able to read a point. The transmitter thus requires space in an already very tight and compact design.

To minimise the disadvantages named above, the present invention is arranged with targets designed with two or more distinct detectable changes. In the embodiment described below, the target is designed as a milled groove. A milled groove is built up of at least two step-like level differences in the form of shoulder parts.

To measure the position of a shoulder part with a non-contact transmitter is easy with regard to the techniques of measurement. Shoulder parts have step-like and transverse level changes that are easy to register with comparatively simple and cheap transmitters. Even with a contact transmitter, it is easy to measure the position of a shoulder part, which gives an instantaneous level change.

When the position for a groove is to be read and the shoulder parts of the groove pass back and forth in front of the transmitter, the transmitter reads the position of two opposite shoulder parts at each pass. In one measuring position, the level change is ascending and in the other measuring position, the level change is descending. From a techniques of measurement point of view, there are errors in measurement included in all measuring

equipment. By reading two positions and calculating the centre position according to the invention, the error of measuring decreases and the accuracy of measurement increases. The groove is arranged so that its walls extend in a direction at right angles to the direction of motion both during translational and rotational movement. The accuracy of measurement decreases if the direction of the walls of the groove does not form a right angle with the direction of motion.

Designing the target as a milled groove in accordance with the invention is furthermore simpler, cheaper and does not call for the same demands for precision in comparison with the pointed target in the American patent document. A milled groove resists wear in a very satisfactory manner. Another practical advantage is that the grooves of the respective axles need not be identical.

DESCRIPTION OF THE DRAWING

The invention will be explained in greater detail by describing an example of an embodiment with reference to the enclosed drawing, where;

Fig. 1 shows an industrial robot including a control system,

Fig. 2 shows a target in the form of a groove with two distinct delimiters plus a transmitter,

Fig. 3 shows a target in the form of an elevation with two distinct delimiters plus a transmitter,

Fig. 4 shows a graphical reproduction of the measured angles (a) and (da) in relation to the zero-position / calibration position.

DESCRIPTION OF EMBODIMENTS

An industrial robot 1 is equipped with a control system 2 (Fig. 1). The movable part 3 of the robot 1 is provided on the respective robot axle with a physical target 4 and on the part 5 accommodating the equivalent robot axle, a sensor 6 is arranged. The target 4 comprises a milled groove that has two essentially vertical walls, 4a and 4b. The grove is designed with two sharp level differences in the form of shoulder parts 7 (Fig. 2).

The device aims, as above, to check / measure a determined position 4c of target 4 on the moving part 3 of robot 1 in relation to a calibration value for the respective robot axle. By running a computer program for calibration fed into the control system, the program will instruct the moving part 3 to pass sensor 6 in one or the other direction of rotation at the same time as the sensor senses the position of the target by detecting the position of the two distinct detectable changes 4a and 4b, calculate the centre-point 4c between the two changes and generate a mean value of an angle, the offset angle a (Fig. 4).

Fig. 4 shows the calibration position / zero position 0 and the offset angle a. It also shows an angle da, measured as above, that is larger than the offset angle a. A difference between the measured angle da and the offset angle a means that something has happened with the configuration of the robot. Included finally, therefore, is to evaluate if this difference is acceptable or not, which is already described in the summary of the invention.

When the robot is calibrated or alternately synchronised, the calibration of all axles takes place one at a time. Alternatively, one can consider calibrating all at the same time.

ALTERNATIVE EMBODIMENTS

The device according to the invention can also be designed with the target arranged on the part that accommodates the robot axle and with the transmitter arranged on the moving part in the respective robot axle.

When evaluating whether the difference d is acceptable or not, the evaluation can be programmed into the control system so that the evaluation is done automatically. Either the go-ahead to start the robot will be given or the order to recalibrate it.

Instead of having permanent sensors at every robot axle, one can instead arrange a space, e.g. an opening to hang a separate sensor in.

The sensor can either be a contact sensor or a non-contact sensor.

The target can also be an elevation with at least two essentially vertical sides.

The distinct detectable changes of the target can comprise several step-like structural changes.

The moving part in the respective robot axle can, during the positional measuring, be displaced only in one direction. In this case, the measuring still gives almost an equivalent result as when the movable part is displaced back and forth.

CLAIMS

1 Method for synchronising a robot (1) that includes a control system (2), a first robot part (3) and a second robot part (5) movably attached to the first robot part (3), whereby the position of a target (4) arranged on the first robot part (3) is determined by the passage of a sensor (6) arranged on the second robot part (5) and is compared with a calibration position in the control system c h a r a c t e r i s e d in that the target (4) is caused to include several distinct detectable changes (4a) and (4b), that the distinct detectable changes are sensed by the sensor (6), that the position (4c) of the target is calculated and that the calculated value is introduced into the control system.

2 Method according to claim 1 c h a r a c t e r i s e d in that the distinct detectable changes comprise step-like structural changes.

3 Method according to claim 1 c h a r a c t e r i s e d in that the position of the target (4) is read with a sensor (6) in the form of a non-contact sensor.

4 Method according to claim 1 c h a r a c t e r i s e d in that the position of the target (4) is read with a sensor in the form of a contact sensor.

5 Method according to any of the previous claims c h a r a c t e r i s e d in that the target (4) is designed as a groove with essentially vertical walls (4a) and (4b).

6 Method according to claim 1 c h a r a c t e r i s e d in that the target (4) is designed as an elevation with essentially vertical sides (4a´) and (4b´).

7 Device for synchronising a robot (1) that includes a control system (2), a first robot part (3) and a second robot part (5) movably attached to the first robot part (3) where the device includes a target (4) arranged on the first robot part (3) and a sensor (6) arranged on the second robot part (5) c h a r a c t e r i s e d in that the target (4) includes several distinct by the sensor (6) detectable changes.

8 Device according to claim 7 characterised in that the distinct detectable changes comprise instantaneous level differences in the form of shoulder parts (7).

9 Device according to claim 7 characterised in that the target (4) is designed as a groove with essentially vertical walls (4a) and (4b).

10 Device according to claim 7 characterised in that the target (4) is designed as an elevation with essentially vertical sides (4a) and (4b).

11 Use of a method according to any of claims 1-6 or device according to any of claims 7-10 for an industrial robot.

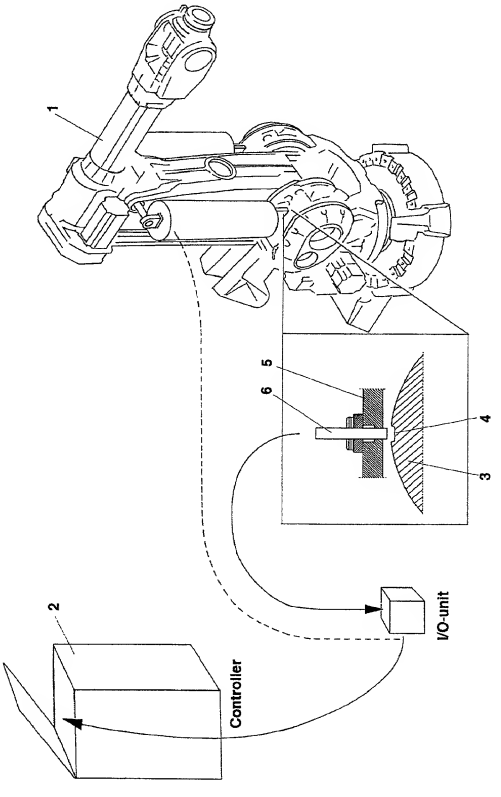


Fig. 1

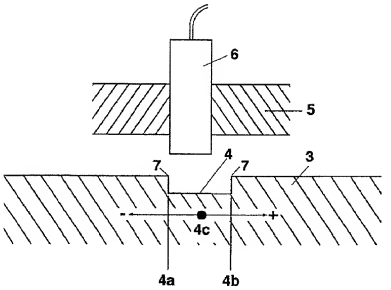


Fig. 2

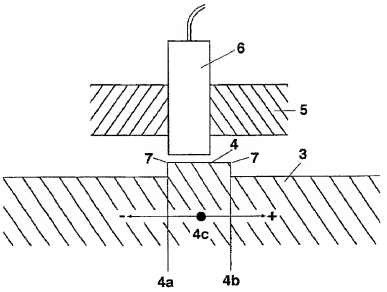


Fig. 3

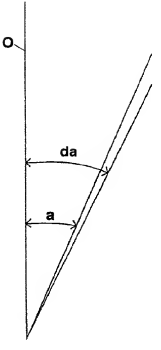


Fig. 4

COMBINED DECLARATION AND POWER OF ATTORNEY FOR **UTILITY** PATENT APPLICATION (Includes PCT)	Attorney Docket No. 66477-015-5

As a below named inventor, We hereby declare that:
My residence, post office address and citizenship are as stated below next to my name; that

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD FOR A ROBOT

the specification of which (check one): [ ] is attached hereto.

[ ] was filed on_____ as Application Serial No. _____ and was amended on _____.

[X] was filed on 13 January 2000 as PCT international application No. PCT/SE00/00043 and was amended under PCT Article 19 on _____ (if applicable).

We hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

We acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

We do not know and do not believe the claimed invention was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application.

We hereby claim foreign priority benefits under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application(s) on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed
9900123-2 (Number)	Sweden (Country)	15 / 01 / 1999 Day/Month/Year Filed	[X] Yes [ ] No
_____ (Number)	_____ (Country)	_____ Day/Month/Year Filed	[ ] Yes [ ] No

We hereby claim the benefit under Title 35, United States Code, §119 (e) of any United States provisional application(s) listed below:

Application No.	Day/Month/Year Filed	Application No.	Day/Month/Year Filed

We hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

Application Serial No.	Filing Date	Status (patented, pending, abandoned)

We hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: Lawrence R. Radanovic, Reg. No. 23,077; Richard H. Tushin, Reg. No. 27,297; Donald N. Huff, Reg. No. 27,561; John P. DeLuca, Reg. No. 25,505; Charles Rutherford, Reg. No. 18,933; Robert L. Kelly, Reg. No. 31,848; Kevin M. Hinman, Reg. No. 35,193; Ernest E. Helms, Reg. No. 29,721; William F. Kolakowski, Reg. No. 41,908; Sandra S. Snapp, Reg. No. 41,444; and William A. Bonk, III, Reg. No. 40,251, all of Dykema Gossett, P.L.L.C. Direct all telephone calls to telephone no. **(202) 522-8600** and faxes to **(202) 522-8669.**

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We hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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